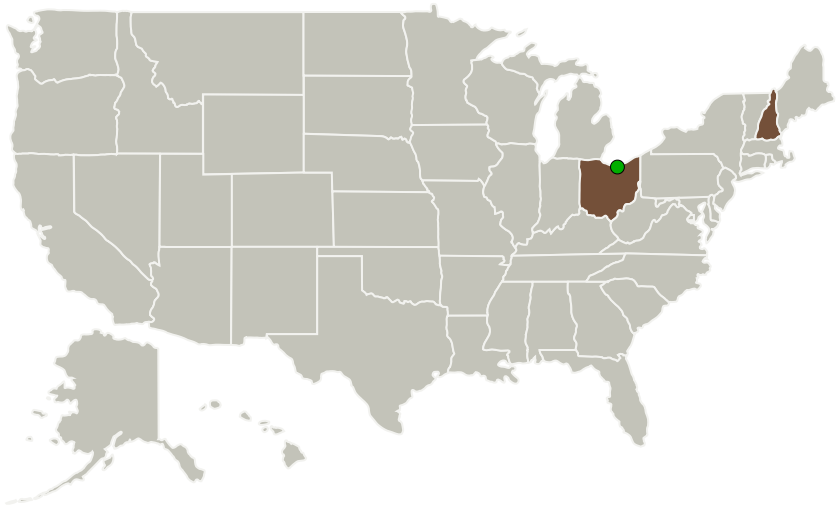
Turbo-Brayton Power Converter for Spaceflight Applications, Phase I

Completed Technology Project (2013 - 2013)

Project Introduction

Future NASA space missions require advanced systems to convert thermal energy into electric power. These systems must be reliable, efficient, and lightweight. In response, we propose to develop a turbo-Brayton power converter with high efficiency and specific power. The converter will use gas bearings to provide reliable, maintenance-free, long-life operation. It will also consist of discrete components that can be packaged to fit optimally with other subsystems, and its continuous gas flow can communicate directly with remote heat sources and heat rejection surfaces without ancillary heat transfer components and intermediate flow loops. Creare is well suited to succeed because we have a long history of developing advanced turbomachines, heat exchangers, and Brayton systems for challenging spaceflight applications. We will complete detailed analyses, trade studies, fabrication trials, and preliminary designs for the components and converter assembly during Phase I, followed by fabrication and testing of a breadboard converter during Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Creare LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Continued on following page.

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
New Hampshire	Ohio

Project Transitions

May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137348)*

Images

Project Image
Turbo-Brayton Power Converter for Spaceflight Applications
(https://techport.nasa.gov/image/136977)

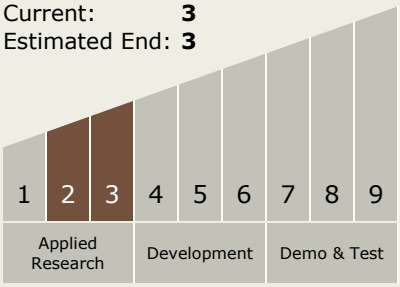
Project Management *(cont.)*

Principal Investigator:
Jeffrey J Breedlove

Co-Investigator:
Jeffrey Breedlove

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.3 Electrical Power Conversion and Regulation

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Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System